SYLLABUS DEL CORSO

Metodi Statistici per l'Amministrazione delle Imprese - 2

2324-2-E1802M119-T2

Learning objectives

Students will be prepared to locate proper statistical techniques to support decision-making in business. Students will learn how to manage uncertainty in business and how to strive for quality improvement in production, by using suitable data-processing tools. Students will develop a critical approach when dealing with data processed by third parties, focussing on the fulfillment of the underlying assumptions. Moreover, students will develop the ability to communicate the outcomes of data processing, even to people without any statistical knowledge. Finally, students will learn how to understand other statistical techniques, not covered in this course, which might be dealt with for study or work.

Contents

The course aims at providing suitable knowledge of probability and of statistical techniques for sample data, especially those concerning economic phenomena and business. Statistical techniques to monitor and to improve the quality of manufacturing processes will also be dealt with.

Detailed program

Random experiments and probablity models. Methods for probability assignment. Kolmogorov axioms and probability laws. Basic combinatorial calculus for classical probability computation. Conditional probability. Product rule. Independent events. Total probability law and Bayes' rule. Random variables. Discrete and continuous distributions. Joint distributions and independence. Expectation, variance and covariance. Widely used distributions: Bernoulli, binomial, multinomial, hypergeometric, Poisson, exponential and normal. Normal approximations.

Sampling and sampling distributions. Finite and infinite populations. Parameters. Simple random sampling and other sampling designs. Sample statistics and point estimation. Sample mean and sample proportion.

Interval estimation. Confidence intervals, margin of error, confidence level. Confidence intervals for the population mean: known and unknown variance. Minimum sample size computations. Confidence intervals for a proportion.

Hypothesis testing. Null and alternative hypothesis. Type I and type II errors. Significance level of a test. Critical-value approach and p-value approach. One-sided and two-sided tests. Relationship between two-sided tests and confidence intervals. Tests on the population mean: known and unknown variance. Tests on a proportion.

Tests and confidence intervals for the difference between two means: paired and independent samples. Tests and confidence intervals for the difference between two proportions.

Two Chi-squared tests: goodness-of-fit and independence.

Linear regression model. Methods for testing the assumptions. Parameter estimation and confidence intervals. Significance test. Confidence intervals for conditional means and prediction intervals. Introduction to multivariate regression models.

Prerequisites

Basic statistics. Descriptive statistics. Basic mathematics.

Teaching methods

Frontal lessons (theory and examples).

Assessment methods

The exam is written. The exam consists of three exercises to test students' ability to locate proper methods for the solution of some practical problems. The exam contains also questions to test students' knowledge and understanding of definitions, their ability to motivate the method of choice in their solutions to the proposed problems as well as their ability to interpret results. Evaluation of these questions depends heavily on proper use of techincal terms introduced during the course. Students who don't pass the written exam but achieve close to passing score will be asked to take an additional oral exam.

Textbooks and Reading Materials

D. Anderson, D. Sweeney, T. Williams "Statistica per le analisi economico-aziendali", 2010, Apogeo Education – Maggioli Editore.

Slides delle lezioni fornite dal docente (sulla pagina eLearning del corso).

Semester

Second semester.

Teaching language

Italian.

Sustainable Development Goals

QUALITY EDUCATION | GENDER EQUALITY | INDUSTRY, INNOVATION AND INFRASTRUCTURE | RESPONSIBLE CONSUMPTION AND PRODUCTION